REMARKS/ARGUMENTS

The Applicants originally submitted Claims 1-21 in the application. In previous amendments, the Applicants amended Claims 1-4, 7-9, 14-17 and 21. In the present response, the Applicants have not amended, cancelled, or added any claims. Accordingly, Claims 1-21 are currently pending in the application.

I.   **Rejection of Claims 1, 3, 6, 8, 10 and 13 under 35 U.S.C. §103**

The Examiner has rejected Claims 1, 3, 6, 8, 10 and 13 under 35 U.S.C. §103(a) as being unpatentable over Applicant Admitted Prior Art (AAPA) in view of U.S. Patent No. 4,562,425 to Turner, *et al.,* and in further view of U.S. Patent No. 6,553,087 to Alelyunas, *et al.* The Examiner further cites sections of a text book by Messerschmitt and Lee entitled "Digital Communications" to point out that it is notoriously known to one of ordinary skill in the art that a slicer includes a reference constellation having a zone, *i.e.,* a decision zone (region), having a boundary formed by a set of points that are equidistant from a reference symbol, so as to determine a candidate symbol. (*See* Examiner's Final Rejection, page 4.) Even so, the Applicants respectfully disagree since the cited combination does not teach or suggest recognizing a candidate symbol as being a zero-amplitude symbol when the candidate symbol is within a zone having a boundary formed by a set of points that are equidistant *between an origin of a constellation and a nearest one of four symbols proximate thereto* as recited in independent Claims 1 and 8.

The Examiner recognizes that the AAPA and Turner, individually or combined, do not teach or suggest recognizing a zero-amplitude symbol as recited in independent Claims 1 and 8.

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(*See* Examiner's Final Rejection, pages 2-3.) To teach such recognizing, the Examiner cites

Alelyunas. (*See* Examiner's Final Rejection, pages 3-4.) Alelyunas discloses a receiver having a

slicer that chooses from a set of possible valid receivable levels a level, or "point" which most

closely matches the current received signal level. (*See* column 3, lines 41-43.) The Applicants

fail to find, however, where the slicer of Alelyunas forms a boundary around the origin of the

constellation to determine if a symbol is a zero-amplitude symbol. More specifically, Alelyunas

provides no teaching or suggestion that the slicer employs a zone having a boundary formed by a

set of points that are equidistant between an origin of a constellation and a nearest one of four

symbols proximate thereto to determine if a symbol is a zero-amplitude symbol. Thus, even

though Alelyunas discloses a slicer, Alelyunas does not disclose a slicer having boundary formed

around the origin of a constellation and does not cure the above deficiency of the combination of

AAPA and Turner.

      As noted above, the Examiner cites Messerschmitt to further point out that a conventional

slicer includes a reference constellation with a boundary formed by a set of points that are equidistant

from a reference symbol, so as to determine a candidate symbol. Nevertheless, as in Alelyunas, the

boundary or zone disclosed by Messerschmitt is not formed by a set of points that are equidistant

between an origin of a constellation and a nearest one of four symbols proximate thereto. Instead,

Messerschmitt teaches a complex plane can be divided into decision regions where each decision

region is the set of points that is closest to some symbol. Messerschmitt defines decision regions

whose boundaries are formed by lines equidistant between a symbol and the four nearest adjoining

symbols. (*See* Messerschmitt, page 188 and Figure 6-28 on page 189.)

In contrast, the present invention is directed to a system and method for recognizing zero-amplitude symbols in a quadrature amplitude modulation (QAM) signal and a digital receiver incorporating the system or the method. As evidenced by an embodiment of the present invention in Figure 3, the candidate symbol is recognized as a zero-amplitude symbol when the candidate symbol is within a zero-amplitude zone 310 having a boundary formed by a set of points that are equidistant between an origin 320 of the constellation 300 and the nearest one of four neighboring ideal symbols 330a, 330b, 330c, 330d in the constellation. This differs from Messerschmitt that discloses regions that go through the origin but not a region around the origin. (*See* Messerschmitt, Figure 6-28, page 189.) The Applicants do not find in Messerschmitt a zero-amplitude symbol or distinct zone at the origin of the constellation as represented by the above embodiment of Figure 3 and presently claimed.

A further example of the present invention's recognition of zero-amplitude symbols is evidenced in the embodiment illustrated in Figure 4. Here the candidate symbol 420 is properly recognized as a zero-amplitude symbol. In Messerschmitt, the candidate symbol 420 would be erroneously recognized as the symbol at (-1,-1) on the Cartesian plane of the constellation. (*See* Messerschmitt, Figure 6-28, page 189.) Thus, Messerschmitt, like Alelyunas, does not even recognize the importance of determining a zero-amplitude symbol. Therefore, Messerschmitt does not teach or suggest recognizing a candidate symbol as being a zero-amplitude symbol when the candidate symbol is within a zone having a boundary formed by a set of points that are equidistant between an origin of a constellation and a nearest one of four symbols proximate thereto as recited

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in independent Claims 1 and 8. As such, Messerschmitt does not cure the above deficiency of the combination of AAPA, Turner, and Alelyunas.

Since the cited combination of AAPA, Turner, Alelyunas, and Messerschmitt does not teach or suggest each element of independent Claims 1 and 8, the cited combination does not provide a *prima facie* case of obviousness of independent Claims 1 and 8 and Claims dependent thereon. As such, Claims 1, 3, 6, 8, 10 and 13 are not unpatentable in view of the cited combination. Accordingly, the Applicants respectfully request the Examiner to withdraw the §103(a) rejection with respect to Claims 1, 3, 6, 8, 10 and 13 and allow issuance thereof.

II.   **Rejection of Claims 2, 4-5, 7, 9, 11-12 and 14 under 35 U.S.C. §103**

The Examiner has rejected Claims 2, 4-5, 7, 9, 11-12 and 14 under 35 U.S.C. §103(a) as being unpatentable over AAPA in view of Turner and Alelyunas, and in further view of U.S. Patent No. 5,471,508 to Koslov. The Applicants respectfully disagree.

As discussed above, the cited combination of AAPA, Turner and Alelyunas, does not teach or suggest each element of amended independent Claims 1 and 8. Koslov has not been cited to cure the noted deficiencies of the cited combination but to teach the subject matter of dependent Claims 2, 4-5, 7, 9, 11-12 and 14. As such, the cited combination does not provide a *prima facie* case of obviousness of Claims 1 and 8 and Claims dependent thereon. The Applicants, therefore, respectfully request the Examiner to withdraw the §103(a) rejection with respect to Claims 2, 4-5, 7, 9, 11-12 and 14 and allow issuance thereof.

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III.   Rejection of Claims 15, 17 and 20 under 35 U.S.C. §103

The Examiner has rejected Claims 15, 17 and 20 under 35 U.S.C. §103(a) as being unpatentable over Alelyunas in view of a portion of the textbook prepared by Rappaport, AAPA and in further view of Turner. The Applicants disagree.

As discussed above, the cited combination of Alelyunas, AAPA, Turner and even Messerschmitt, does not teach or suggest recognizing a candidate symbol as being a zero-amplitude symbol when the candidate symbol is within a zone having a boundary formed by a set of points that are equidistant between an origin of a constellation and a nearest one of four symbols proximate thereto as recited in independent Claims 1 and 8. Rappaport has not been cited to cure this deficiency of Messerschmitt, Alelyunas, AAPA and Turner but to teach an amplitude detector. (*See* Examiner's Final Rejection, page 9.) The cited combination against Claim 15, therefore, does not provide a *prima facie* case of obviousness of independent Claim 15 which also includes recognizing a candidate symbol as being a zero-amplitude symbol when the candidate symbol is within a zone having a boundary formed by a set of points that are equidistant between an origin of a constellation and a nearest one of four symbols proximate thereto. As such, Claim 15 and Claims 17 and 20 which depend thereon are not unpatentable in view of the cited combination. Accordingly, the Applicants respectfully request the Examiner to withdraw the §103(a) rejection with respect to Claims 15, 17 and 20 and allow issuance thereof.

IV.   Rejection of Claims 16, 18-19 and 21 under 35 U.S.C. §103

The Examiner has rejected Claims 16, 18-19 and 21 under 35 U.S.C. §103(a) as being unpatentable over Alelyunas in view of Rappaport, AAPA, Turner and, and in further view of Koslov. The Applicants respectfully disagree.

As discussed above, the cited combination against Claim 15 does not provide a *prima facie* case of obviousness of independent Claim 15. Koslov has not been cited to cure the noted deficiencies of the cited combination but to teach the subject matter of dependent Claims 16, 18-19 and 21. As such, the cited combination with Koslov does not provide a *prima facie* case of obviousness of Claim 15 and Claims dependent thereon. The Applicants, therefore, respectfully request the Examiner to withdraw the §103(a) rejection with respect to Claims 16, 18-19 and 21 and allow issuance thereof.

IV.   Conclusion

In view of the foregoing remarks, the Applicants now see all of the Claims currently pending in this application to be in condition for allowance and therefore earnestly solicit a Notice of Allowance for Claims 1-21.

The Applicants request the Examiner to telephone the undersigned attorney of record at (972) 480-8800 if such would further or expedite the prosecution of the present application. The Commissioner is hereby authorized to charge any fees, credits or overpayments to Deposit Account 08-2395.

Respectfully submitted,

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